MICROTÆNIELLA CLYMENELLÆ, A NEW GENUS AND NEW SPECIES OF COLONIAL GREGARINES.

GARY N. CALKINS.

While examining the gut contents of marine annelids at Woods Hole during the month of June, 1914, a number of new gregarines were discovered. The majority of these were ordinary types which could not be placed systematically without knowledge of the sporulation stages. One form, however, found in the digestive tract of *Clymenella torquata*, deserves mention because of its remarkable novelty.

To obtain the material, the worms were opened along the mid-dorsal line; sections of the digestive tract about half an inch long, were removed and teased in salt solution on cover glasses. The material thus prepared was examined while fresh, and, if interesting, was then fixed in sublimate acetic and stained. In this way I have obtained more than a hundred specimens of the curious organism described here.

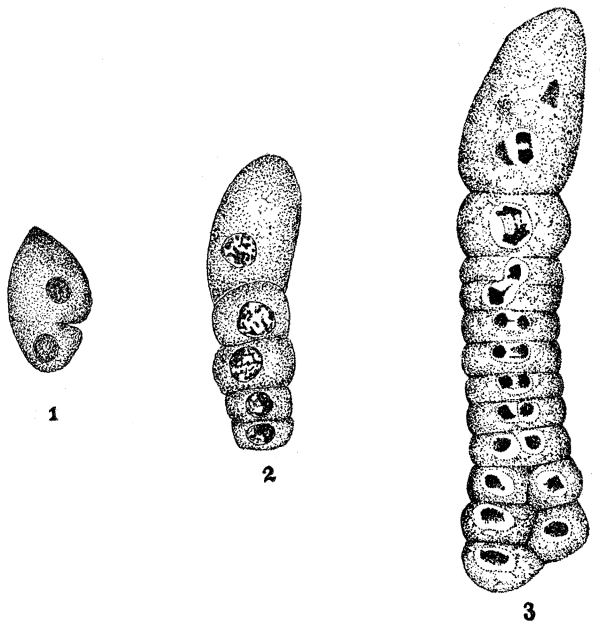
The name *Microtæniella* is given because of the Tænia-like structure of the organism (Figs. 1–5). The initial single cell resembles a scolex and the chain of cells, formed partly from the initial cell and partly by cell division of the daughter individuals, resembles a chain of proglottids. In sporozoan terminology these may be termed the primite and satellites respectively, although this involves some elasticity in the use of the terms primite and satellite which are usually employed to designate the primary and secondary individuals in a chain of gregarines formed by secondary association.

In the living state, the organism is colorless but with the characteristic dense protoplasmic structure of the gregarines. The average dimensions of the chain are 84 μ in length and 15 μ in width, the size of mature chains varying but little from the average.

The earliest stage found was an initial cell with two nuclei and the beginnings of a septum cutting off a first satellite (Fig. 1).

All intermediate stages between this young form and stages pictured in Figs. 4 and 5 were found. Each satellite contains a single nucleus except in the division stages and in the terminal cells of the oldest satellites.

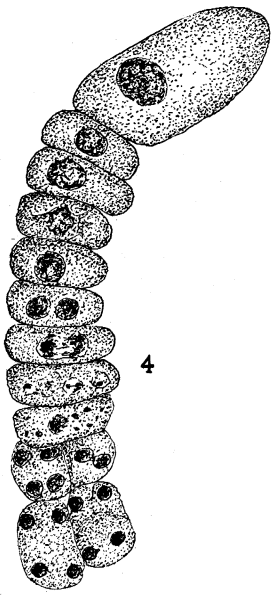
New cells are continuously given off by the primite; these reproduce by division, the plane of division being at right angles to the long axis of the aggregate for the first one or two divisions. In some chains the successive individuals furnish almost every stage for an ideal diagram of cell division (Fig. 3). In the older



satellites the plane of division changes from transverse to longitudinal in respect to the long axis of the chain. In this way two terminal chains may originate, but such branch chains never become very long owing to further development and to separation of the satellites from the parent colony.

After from eight to ten satellites have been produced thus by division, the terminal cells become more spherical, their nuclei divide twice, and without cytoplasmic division, giving rise to a terminal group of cells each with four nuclei (Fig. 4). This stage must persist for some time for several specimens were found

without evidence of further advance. In one specimen (Fig. 5), a group of terminal satellites, evidently the result of this phase of activity in two branched terminal chains, were present. Ultimately, division planes appear in the cytoplasm around each of the four nuclei, and four naked cells are produced. The fate of these cells is not known; possibly they become new primites



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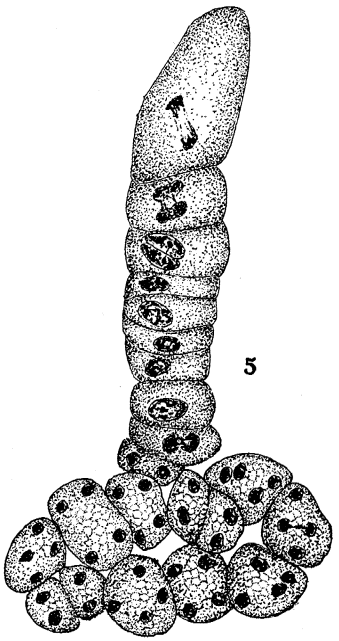

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and repeat the cycle, but more probably, they are gametes which unite to form sporoblasts characteristic of the gregarines. I shall try to work out their further history during the coming June.

This rather paradoxical organism has given me a great deal of trouble. Is it a metazoön or a protozoön? Is the "individual" the entire chain or is it a chain of individuals? Although the aggregate has a definite morph and a definite ontogeny I am inclined to regard it as a chain of individuals in which original reproduction by division has become modified to asymmetrical division or budding in the primite, but is retained by the satellites. Originally, it may be assumed, the daughter individuals became separated and after a few divisions finally gave rise to

sporonts. If the entire chain is regarded as the individual we are met by the same difficulty which confronts us in connection with the colonial flagellates.

The possibility of this being a plant form has not been overlooked. The absence of definite walls together with the method of cell division and terminal cell changes are opposed to what is known of types in the group of fungi. To make sure, however, I showed the specimens to my colleague Professor R. A. Harper who gives me permission to quote him to the effect that he finds nothing in the structure or the history of this organism that would justify him in placing it with plant forms.

Amongst protozoa, nothing, so far as I am aware, has been described of like nature. Leger's *Tæniocystis* is a gregarine with numerous septa and with external annulations which give it the appearance of a *Tænia*, but it is a single cell and has a single nucleus. The absence of motile organs in the present form, and its mode of reproduction, leave no grounds for placing it otherwise than with the sporozoa, and here the only possible place for it is with the gregarines. There is some evidence that the often sharply pointed end of the primite is the attaching portion, but no stage showing such attachment has been found in the smears.

I would classify *Microtæniella* as a colonial parasite belonging to the order Gregarinida, suborder Schizogregarina, of which it should form a new subdivision.

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